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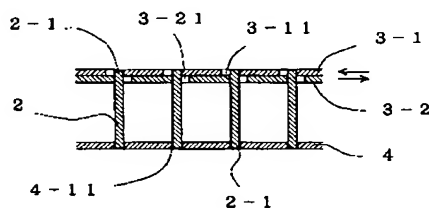
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(54) 【発明の名称】 板部材の締結構造と固定方法

(57) 【要約】 (修正有)

【課題】 片端で保持されて多数並立するブレード等の他端を、夫々に対応する板部材の挿入用小孔又は溝に同時に嵌着挿入する組立工程の大幅な改善を実現すること。

【解決手段】 板部材3を、外側と内側の板部材3-1及3-2を二枚重ねて構成し、多数並立するブレード2の他端部が挿入されるべき各板部材に形成された小孔又は溝3-1 1及び3-2 1を、ブレードの厚みよりも幅広に形成して、ブレードの挿入後は、両側板部材をずらして、双方の小孔又は溝が、部分的には連通した状態で、かつ互いにずれた状態で、ブレードの両面に互に対向して当接しながら固定保持する。



【特許請求の範囲】

【請求項1】 板部材に小孔もしくは溝を穿設し、該小孔もしくは溝に被着部材端部を挿入して両者を保持固定する板部材と被着部材との締結構造において、小孔もしくは溝を設けた板部材は二枚重ねで構成され、前記小孔もしくは溝が、前記被着部材端部の厚みより幅広に形成され、前記二枚重ねされた板部材の小孔もしくは溝は、双方の小孔もしくは溝が、部分的に連通しながら互いにずれた状態で前記被着部材端部の両面に互に対向し当接するようにして固定保持されていること、を特徴とする板部材と被着部材との締結構造。

【請求項2】 両側の側板と、該両側板に懸架される複数のブレードで形成されるインペラの側板とブレードとの締結構造において、少なくとも一方の側板が二枚重ねであって、該二枚重ねの側板に形成されるブレードの端部挿入用小孔もしくは溝は、ブレードの厚みよりも幅広に形成され、前記二枚重ねされた側板の小孔もしくは溝は、双方の小孔もしくは溝が、部分的に連通しながら互いにずれた状態で前記ブレード端部の両面に互に対向し当接するようにして固定保持されていること、を特徴とするインペラの側板とブレードとの締結構造。

【請求項3】 夫々が被着部材を挿入するための小孔もしくは溝を備える板部材を二枚重ねする工程と、前記二枚重ねされた板部材の夫々連通する小孔もしくは溝に、被着部材の端部を挿入する工程と、前記被着部材端部が嵌着された二枚重ねの板部材を互いにずらせて、夫々の小孔もしくは溝の一边が前記被着部材端部の両面に互に対向し当接するようにする工程と、夫々の小孔もしくは溝の一边を被着部材端部両面に当接した状態のまま、両者を保持固定する工程とを備えること、を特徴とする板部材と被着部材との固定方法。

【請求項4】 二枚重ねの板部材と被着部材との嵌着部を、レーザー光線で一体的に溶着固定すること、を特徴とする請求項3に記載の板部材と被着部材との固定方法。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、インペラにおける側板とブレードとの締結に代表されるような、小孔もしくは溝を形成した板部材と、前記小孔もしくは溝に嵌着保持される被着部材との締結手段に関する。

【0002】

【従来の技術】本発明対象物の代表例として、シロッコファンのインペラについて説明する。図4～図6は夫々、シロッコファンのインペラの構成を示す正面図、矢視部分断面図と、側板とブレードとの組立の様子を示す説明図である。

【0003】インペラの全体構造そのものは周知のものであるので詳細を省くが、当該インペラを形成する一枚

のブレードを示す図5に見るように、下側の側板の小孔にブレード片端の締結用突起が嵌着され、円弧状に並立するブレードの他端は上側の側板とも締結用突起の小孔への嵌着で固定保持されている。通常インペラを構成する両側板は、多数並立するブレードにより互いに固定されているので、上記側板のブレード挿入孔とブレード側の締結用突起とは整合に近い寸法関係を要し、位置ずれや保持強度維持の面からも、所謂嵌合部の大きな遊びは好ましくないものであるため、ブレード数が少ないときには、当該ブレードを同時に嵌着挿入することもして問題を生じないが、多数のブレードを要する構成では、挿入組立の難度が高くコスト的なデメリットが大きいのが実態であった。

【0004】図6は上述の通り従来技術になる側板へのブレードの他端挿入の様子を示すもので、各ブレードの片端が下側の側板で保持されているとは言え、並立する多数のブレードは必ずしも上側側板の挿入用小孔に対向するように位置することは期待できず、夫々が前後にずれておりブレード多端の嵌着用突起は、側板を単純に移動させることでは挿入用小孔に嵌着し得ないものであった。

【0005】

【発明が解決しようとする課題】上述の如き従来の構成では、多数並立するブレードの他端を、夫々のブレードに対応する側板の挿入用小孔に同時に嵌着挿入することは至難で、組立工数の面で大幅な改善を求められているのが実態であった。

【0006】

【課題を解決するための手段】本発明に成る板部材と被着部材との締結構造は、インペラにおける側板で代表される板部材に小孔もしくは溝を穿設し、該小孔もしくは溝に同じくインペラにおけるブレードに代表される被着部材端部を挿入して両者を保持固定するため、小孔もしくは溝を設けた板部材は二枚重ねで構成され、前記小孔もしくは溝が、前記被着部材端部の厚みより幅広に形成され、前記二枚重ねされた板部材の小孔もしくは溝は、双方の小孔もしくは溝が、部分的に連通しながら互いにずれた状態で前記被着部材端部の両面に互に対向し当接するようにして固定保持され、

【0007】また、上記構成を実現する方法として、夫々が被着部材を挿入するための小孔もしくは溝を備える板部材を二枚重ねする工程と、前記二枚重ねされた板部材の夫々連通する小孔もしくは溝に、被着部材の端部を挿入する工程と、前記被着部材端部が嵌着された二枚重ねの板部材を互いにずらせて、夫々の小孔もしくは溝の一边が前記被着部材端部の両面に互に対向し当接するようにする工程と、夫々の小孔もしくは溝の一边を被着部材端部両面に当接した状態のまま、両者をレーザー光線照射等の溶着等での保持固定する工程とを含んで固定保持される。

【0008】

【実施例】以下図面によって本発明の実施例を、上述の通り当該対象構成の代表的な形態として、シロッコファンのインペラを形成する側板とブレードを例として説明するが、一般的な板部材と、これに嵌着保持される被着部材との締結に適用されるものであることは言うまでもない。

【0009】図1は、本発明に成るインペラの例の部分断面図で、下方の側板に固着されて並立する多数のブレードは、その他端が上方の側板に保持されるが、当該上

【0010】そして上方側板の内側のものAと外側のものBには、夫々にブレード端部突起を嵌着する小孔が形成されているが、嵌着されるブレードの厚みに対し、図に見るように内側Aはブレードの右に隙間を有し、外側Bはブレードの左に隙間をもって締結されている。

【0011】ブレードの端部はその両面を内側の側板で左面が、外側の側板で右面が、夫々当接保持され、この状態で例えばレーザー溶着等の手段で固着保持されることになる。

【0012】本願の目的である作業性の向上を示すための説明図が図2及び図3で、下方の側板に固定され並立するブレードは、下方側板とブレード片端との嵌着精度にも関わり立錐状態が決まるが、夫々のブレード上端の位置精度にはばらつきが生じることは避けようも無いので、各ブレードの端部を側板の小孔に嵌着し易くするために、当該挿入用小孔の大きさを増すことが有効である。しかし、上述の通り、両側板は両者に跨って懸架されるブレードにより互いに固定保持されるため、側板とブレードとの嵌着構造として遊嵌状態は好ましいものではないので、図2のように二枚重ねの側板は、双方の挿入用孔を揃えて大きな窓としておき、図3に見るように大きな窓へのブレード端部挿入で挿入を容易とし、この後図1に示すように二枚重ねの側板を互いにずらせることで、ブレード端部の両面に夫々の孔の互いに対向する辺を当接し、恰も密着整合状態での嵌着状態を現出させることになる。

【0013】上述の例では、一方の上方側板を二枚重ねとして嵌着後のずらし構造を示しているが、下方にも適用できることは言うまでも無く、また側板に設ける小孔*40

*もしくは溝の形状等も任意選択可能であることも言うまでも無い。

【0014】更に、側板とブレード端部との嵌着後の固着手段についても、レーザー光線の照射による溶着のほか、従来周知の手段を任意選択可能である。

【0015】そして、上述の如く、インペラに限らず、小孔もしくは溝を形成した板部材と前記小孔もしくは溝に嵌着される被着部材一般の構成での締結手段として有用なことも言うまでも無い。

10 【0016】

【発明の効果】本発明に成る板部材と被着部材との締結手段は、挿入嵌着が容易であるばかりでなく、嵌着後の保持構造での信頼性の高い締結手段として利用価値が高い。

【図面の簡単な説明】

【図1】本発明に成るインペラの例の部分断面で示す説明図である。

【図2】図1の例の側板（板部材）へのブレード（被着部材）端部挿入前の様子を示す説明図である。

20 【図3】図1の例の側板（板部材）へのブレード（被着部材）端部挿入状態を示す説明図である。

【図4】従来技術に成る例として示すインペラの正面図である。

【図5】図4の例の側板（板部材）とブレード（被着部材）との嵌着状態を示す矢視断面図である。

【図6】図4の例の側板（板部材）とブレード（被着部材）との嵌着前の状態を示す説明図である。

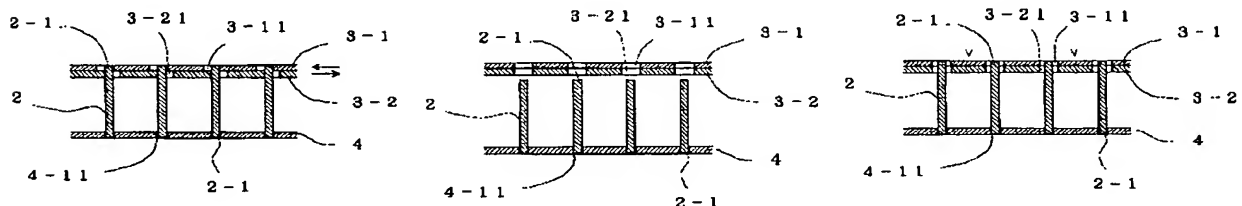
【符号の説明】

- | | |
|------|-------------------------|
| 1 | インペラ |
| 2 | ブレード（被着部材） |
| 2-1 | ブレードの挿入嵌着用小突起（被着部材の嵌着部） |
| 3 | 他方の側板（板部材） |
| 3-1 | 二枚重ねの外側の側板（板部材） |
| 3-11 | 外側の側板の小孔もしくは溝 |
| 3-2 | 二枚重ねの内側の側板（板部材） |
| 3-21 | 内側の側板の小孔もしくは溝 |
| 4 | 一方の側板（板部材） |
| 4-11 | 一方の側板の小孔もしくは溝 |

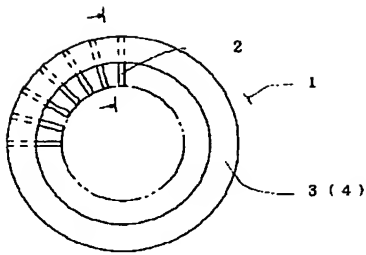
【図1】

【図2】

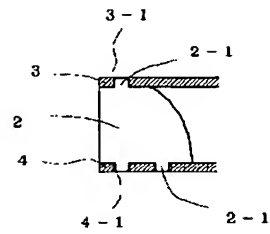
【図3】



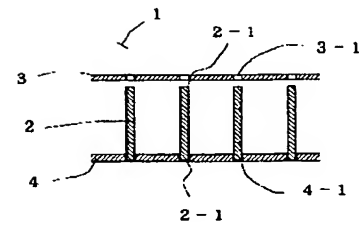
【図4】



【図5】



【図6】



フロントページの続き

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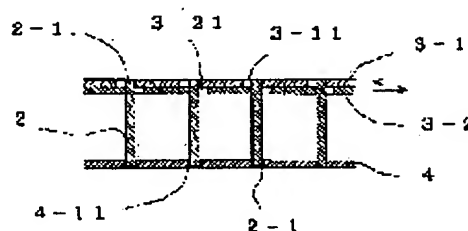
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(54) FASTENING STRUCTURE AND FIXING METHOD OF PLATE MEMBER

(57)Abstract:

PROBLEM TO BE SOLVED: To improve assembling process to the greatest degree by inserting one end of each of plural blades arranged and held at the other end thereof into a small hole or groove of a plate member corresponding thereto.

SOLUTION: Two plate as outer plate 3-1 and inner plate 3-2 are laminated to constitute the plate member. Ends of a plurality of blades 2 are expected to be inserted into corresponding small holes or grooves 3-11, 3-21 formed in the respective plate members such that each width is larger than the thickness of the blade. After insertion of blades, both plate members are displaced with each other such that small holes or grooves of the respective plate members face to and abut against both surfaces of the blades so as to be fixed and held in the state where they are partially communicated and partially displaced.



LEGAL STATUS

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CLAIMS

[Claim(s)]

[Claim 1] In the conclusion structure of the plate member and covering member which drill a stoma or a slot in a plate member, insert a covering member edge in this stoma or a slot, and carry out maintenance immobilization of both The plate member which prepared the stoma or the slot consists of double coursed, and said stoma or slot is formed more broadly than the thickness of said covering member edge. Said stoma or slot of a plate member by which double coursed was carried out Conclusion structure of the plate member and covering member which are characterized by countering both sides of said covering member edge mutually, and carrying out fixed maintenance as it contacts after the stomata or slots on both have shifted mutually, being selectively open for free passage.

[Claim 2] In the conclusion structure of the side plate of both sides, the side plate of the impeller formed with two or more blades by which suspension is carried out to this both-sides plate, and a blade At least on the other hand, the stoma for edge insertion or slot on the blade which a side plate is double coursed and is formed in this two-ply side plate It is formed more broadly than the thickness of a blade. Said stoma or slot on the side plate by which double coursed was carried out Conclusion structure of the side plate of an impeller and blade which are characterized by countering both sides of said blade edge mutually, and carrying out fixed maintenance as it contacts after the stomata or slots on both have shifted mutually, being selectively open for free passage.

[Claim 3] The process which carries out double coursed of the plate member equipped with a stoma or a slot for each to insert a covering member, The process which inserts the edge of a covering member in the stoma or slot of said plate member by which double coursed was carried out which is open for free passage, respectively, It can shift mutually, and both sides of said covering member edge are countered mutually, it is made for one side of each stoma or a slot to contact, and it shifts the two-ply plate member in which said covering member edge was attached. A process, The fixed approach of of the plate member and covering member which are characterized by having the process which carries out maintenance immobilization of both with the condition of having contacted covering member edge both sides in one side of each stoma or a slot.

[Claim 4] The fixed approach of of the plate member and covering member according to claim 3 which are characterized by carrying out joining immobilization of the attachment section of a two-ply plate member and a covering member in one with a laser beam.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the conclusion means of the plate member in which a stoma or a slot which is represented by conclusion with the side plate and blade in an impeller was formed, and the covering member by which attachment maintenance is carried out in said stoma or slot.

[0002]

[Description of the Prior Art] The impeller of a sirocco fan is explained as an example of representation of this invention object. Drawing 4 - drawing 6 are the front view and view fragmentary sectional view showing the configuration of the impeller of a sirocco fan, and the explanatory view showing the situation of the assembly of a side plate and a blade, respectively.

[0003] Since the whole impeller structure itself is a well-known thing, a detail is excluded, but the projection for conclusion of blade one end is attached in the stoma of a lower side plate, and fixed maintenance of the other end of the blade which coexists in the shape of radii is carried out by the attachment to the stoma of the projection for conclusion also with the upper side plate so that it may see to drawing 5 which shows the blade of one sheet which forms the impeller concerned. Usually, since many both-sides plates which constitute an impeller are being mutually fixed by the coexisting blade Since the play with the so-called fitting section require dimension relation with the blade insertion hole of the above-mentioned side plate and the projection for conclusion by the side of a blade close to adjustment, and big from the field of a location gap or maintenance maintenance on the strength is not desirable, Although carrying out attachment insertion of the blade concerned simultaneously did not very produce a problem, either, when there were few blades, with the configuration which requires many blades, the cost- [difficulty / the difficulty of insertion assembly is high and] demerit of the actual condition was large.

[0004] Drawing 6 is what shows the situation of other end insertion of the blade to the side plate which becomes the conventional technique as above-mentioned. Although one end of each blade is held with the lower side plate, it is not expectable that the blade of coexisting a large number is located so that the stoma for insertion of an upside side plate may not necessarily be countered. Each had shifted forward and backward and the projection for attachment of blade many items was what cannot be attached in the stoma for insertion in moving a side plate simply.

[0005]

[Problem(s) to be Solved by the Invention] It was most difficult to have carried out attachment insertion of the other end of the blade coexisting [many] with the conventional configuration like **** simultaneous to the stoma for insertion of the side plate corresponding to each blade, and the actual condition was that the extensive improvement is called for in respect of the number of erectors.

[0006]

[Means for Solving the Problem] The conclusion structure of the plate member and covering member which grow into this invention In order to drill a stoma or a slot in the plate member represented with the side plate in an impeller, to insert the covering member edge represented as well as this stoma or a slot by the blade in an impeller and to carry out maintenance

immobilization of both, The plate member which prepared the stoma or the slot consists of double coursed, and said stoma or slot is formed more broadly than the thickness of said covering member edge. Said stoma or slot of a plate member by which double coursed was carried out Both sides of said covering member edge are countered mutually, being selectively open for free passage, in the condition of having shifted mutually, as the stomata or slots on both contact, fixed maintenance is carried out, and it is [0007]. Moreover, the process which carries out double coursed of the plate member equipped with a stoma or a slot for each to insert a covering member as an approach of realizing the above-mentioned configuration, The process which inserts the edge of a covering member in the stoma or slot of said plate member by which double coursed was carried out which is open for free passage, respectively, It can shift mutually, and both sides of said covering member edge are countered mutually, it is made for one side of each stoma or a slot to contact, and it shifts the two-ply plate member in which said covering member edge was attached. A process, Fixed maintenance is carried out including the process which carries out maintenance immobilization of both by joining, such as a laser beam exposure, etc. with the condition of having contacted covering member edge both sides in one side of each stoma or a slot.

[0008]

[Example] Although a drawing explains below the side plate and blade which form the impeller of a sirocco fan for the example of this invention as a typical gestalt of the object configuration concerned as above-mentioned as an example, it cannot be overemphasized that it is what is applied to conclusion with a general plate member and the covering member by which attachment maintenance is carried out at this.

[0009] Although the blade of a large number which drawing 1 is the fragmentary sectional view of the example of the impeller which grows into this invention, and fix to a downward side plate and coexist is held at the side plate of the upper part [other end / the], the upper side plate concerned has structure of a two-sheet pile.

[0010] And to the thickness of the blade attached, although the stoma which attaches a blade edge projection in each is formed in the thing A inside an upper part side plate, and the outside thing B, Inside A has a clearance on the right of a blade, and Outside B is concluded with the clearance on the left of the blade so that it may see to drawing.

[0011] In those both sides, a left surface will be carried out with an inside side plate, contact maintenance of the right face will be carried out with an outside side plate, respectively, and fixing maintenance of the edge of a blade will be carried out with means, such as for example, laser joining, by this condition.

[0012] Although the blade with which it is drawing 2 and drawing 3 , and it is fixed to a downward side plate, and an explanatory view to show improvement in the workability which is the object of this application coexists is concerned also with the attachment precision of a lower part side plate and blade one end and a **** condition is decided, since that dispersion arises does not have how to avoid in the location precision of each blade upper bed, either, in order to make the edge of each blade easy to attach in the stoma of a side plate, it is effective to increase the magnitude of the stoma concerned for insertion. However, since fixed maintenance of the both-sides plate of each other is carried out by the blade by which suspension is carried out ranging over both as above-mentioned and a loosely-fitting condition is not desirable as attachment structure of a side plate and a blade It is being able to shift the two-ply side plate of each other, as a two-ply side plate's arranges both holes for insertion, and uses them as the big aperture like drawing 2 , insertion is made easy by blade edge insertion in the big aperture so that it may see to drawing 3 , and shown in drawing 1 after this. The side which counters both sides of a blade edge mutually [each hole] is contacted, and ** also makes the attachment condition in an adhesion adjustment condition appear.

[0013] Although it shifts after attachment by making one upper part side plate into double coursed and structure is shown in the above-mentioned example, it is not below applicable also until it says, and also until it also says that it can opt for the configuration of the stoma or slot which there is not and is established in a side plate etc.

[0014] Furthermore, it can opt for the means of the conventional common knowledge besides

joining by the exposure of a laser beam also about the means for detachable after attachment with a side plate and a blade edge.

[0015] And like ****, there is nothing also until it says not only an impeller but that it is useful as a conclusion means in the configuration of a general covering member attached in the plate member in which the stoma or the slot was formed, said stoma, or a slot.

[0016]

[Effect of the Invention] The conclusion means of the plate member and covering member which grow into this invention has high utility value as a conclusion means by which the dependability in the maintenance structure after insertion attachment being not only easy but attachment is high.

[Translation done.]

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1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.**** shows the word which can not be translated.

3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the explanatory view shown in the partial cross section of the example of the impeller which grows into this invention.

[Drawing 2] It is the explanatory view showing the situation before the blade (covering member) edge insertion to the side plate (plate member) of the example of drawing 1 .

[Drawing 3] It is the explanatory view showing the blade (covering member) edge insertion condition to the side plate (plate member) of the example of drawing 1 .

[Drawing 4] It is the front view of the impeller shown as an example which grows into the conventional technique.

[Drawing 5] It is the view sectional view showing the attachment condition of the side plate (plate member) of the example of drawing 4 , and a blade (covering member).

[Drawing 6] It is the explanatory view showing the condition before attachment with the side plate (plate member) of the example of drawing 4 , and a blade (covering member).

[Description of Notations]

1 Impeller

2 Blade (Covering Member)

2-1 Small Projection for Insertion Attachment of Blade (Attachment Section of Covering Member)

3 Side Plate of Another Side (Plate Member)

3-1 Side Plate of Two-ply Outside (Plate Member)

3-11 Stoma or Slot of Side Plate on Outside

3-2 Side Plate of Two-ply Inside (Plate Member)

3-21 Stoma or Slot of Side Plate on Inside

4 One Side Plate (Plate Member)

4-11 One Stoma or Slot on the Side Plate

[Translation done.]

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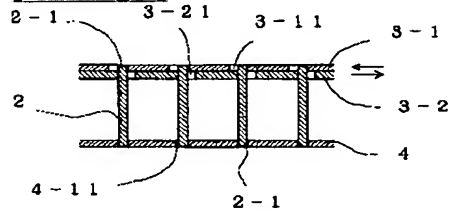
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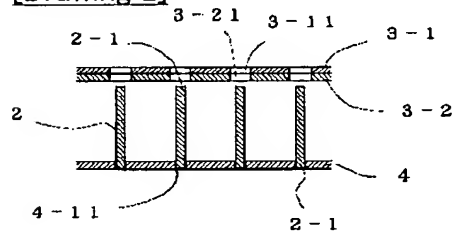
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DRAWINGS

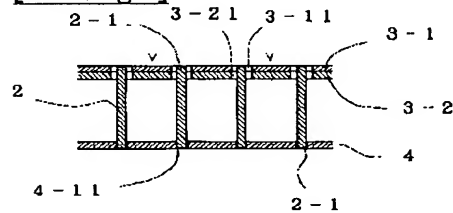
[Drawing 1]



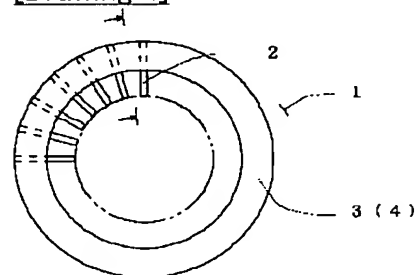
[Drawing 2]



[Drawing 3]



[Drawing 4]



[Drawing 5]